

Hydrophobic Maze

In this project you will design and build a maze. The maze will use an extremely hydrophobic paint coating to enable a bead of water to travel the maze. Designing and constructing the maze will require patience, precision and attention to detail.

Materials:

5x7 note cards	Scissors
TinkerCad	Cutting mat
13cm x 18cm board	Glue
Square disposable chopsticks	Hydrophobic paint
Razor cutter	Drill

Procedures:

1. Look at the example piece and watch how it works.
2. Obtain several note cards and begin brainstorming different designs for you maze. The actual maze will be built on wood the same size as the notecard. Chopsticks are roughly 4mm wide.
3. As you brianstorm your maze remember to ensure there is a route through the maze.
4. Once you have an approved design for you maze create a digital copy in TinkerCad. See the example provided.
5. In TinkerCad click edit grid and make your grid size 127mm x 178mm. Set the snap grid to 1mm. This will give you a work surface the same size as your actual piece of wood.
6. Your pieces can be whatever length you choose, but the width and height should be 4mm.
7. Start out by setting a 4mm border around the whole workspace. Then build the maze.
8. Leave 10mm between pieces to make your channels.
9. Use "cylinders" to make traps in your maze
10. Once you are done export your maze as a .svg file and then print it. Make sure the image is not set to "scale to fit" when you print. Use the printed version to guide you as you construct your maze.
11. Obtain a board to serve as the base of your maze.
12. Watch the demonstration of using the razor knife and scissors before starting.
13. Using the razor knife, scissors, a ruler and a pencil, measure and cut the parts of your maze from chopsticks.
14. Sand the ends of the pieces after cutting to remove burrs.
15. Glue the pieces in place by running a fine bead of glue down each piece and then carefully placing them on the board.
16. Once the glue is dry, mark and drill the traps using the hand drill and 8mm bit.
17. Sand all rough edges smooth around holes.
18. Use paint or sharpie to mark the start and finish points.
19. Watch demo then apply the first layer of waterproofing.
20. Wait 30 minutes then apply second layer.
21. Let dry overnight.
22. Play!

Reflection:

Write a reflection discussing the steps and processes you went through to build the maze. Use complete sentences and your pictures to illustrate your thinking. Be sure to incorporate the following into your reflection:

1. Pictures of each step of the process including any drawing or sketches you made during brainstorming and redesign.
2. Your initial thoughts on the project. Were you confident, concerned, excited?
3. What different designs or ideas did you initially come up with during the brainstorming?
4. How did those designs change or were they modified as you went through the process?
5. Describe what you did during the different phases of making and constructing the project. Include pictures to show the steps.
6. Did the final product come out as you had envisioned it? If you needed to change things during the process why did it need to be redesigned?
7. How would you change either your design or the process if you were to do it again to make it better?
8. What was the most challenging part of the project? What was the most rewarding part of the project?
9. What was the most surprising thing you discovered while working on the project?